*aspera* and *crenata* are really nothing but different names for the same shell, as Weinkauff asserts, it is quite certain that the *Patella* which D'Orbigny has described under the name of *P. Lowei*, is a separate species.

"30. *Cyprœa spurca*, Linn."

Thus given by D'Orbigny. It is also Madeiran.

"31. *Cerithium vulgatum*. See above."

"32. *Cyprœa lurida*."

"Thus given by D'Orbigny. Also Madeiran.

"33.
34. } 0."
&c.

I suppose this implies that these numbers were not represented by specimens.

"41. *Conus grandis*, Sowerby, Gen. Capital. More."

This is published by D'Orbigny under the name of *C. prometheus*, Brug.; and Mr. E. Smith informs me that the type from Canary deposited by D'Orbigny in the British Museum is "a small specimen of this species belonging to the variety which has been named *C. siamensis*." The species is unknown in Madeira. Is it really Canarian?

"Sent afterwards."

"*Patella guttata*, nob. From Isleta of Grand Canary."

To this is added in pencil, "common in Madeira."

D'Orbigny publishes this species under this name. In the text no name of authorship is given; but in the plate (vii. 13–15) it is attributed to "d'Orb."

It is (*fide* J. Gwyn Jeffreys in litt.) the *P. rustica*, L. & Dill., = *P. lusitanica*, Gmel., = *P. punctata*, Lam., = *P. nigropunctata*, Reeve.

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## An account of some New Species, Varieties, and Monstrous Forms of Medusæ.

By GEORGE J. ROMANES, M.A., F.L.S., &c.

[Read April 6, 1876.]

WHILE engaged last summer on an experimental inquiry into the distribution and physiology of the nervous system in Medusæ, I observed that several of the naked-eyed species which I hap-

pened to procure were forms which had not been previously described. Unfortunately I omitted to make any drawings of these new species; but probably I shall have the opportunity of doing so next year, and, if so, shall then hope to have the privilege of submitting the drawings to the consideration of this Society. Meanwhile, however, it seems desirable to communicate to the Society a brief verbal account of these hitherto undescribed species. They were all obtained between the months of May and August, in the Cromarty Frith on the east coast of Scotland.

1. A species of the genus *Tiarops*.—Nectocalyx about an inch and a half in diameter, and of a hemispherical form. Manubrium of great proportional size (viz. about $\frac{5}{8}$ inch long), and in general shape somewhat resembling that of *Geryonia appendiculata*. Tentacles numerous, and proportionally shorter than in *T. diademata*. Diadems eight in number, and disposed as in *T. diademata*. Pearly nodules twelve. The animal is luminous when irritated—the light being of a pale phosphorescent hue, and restricted in its position to a narrow but continuous line all round the margin of the nectocalyx. Individuals of the species are very numerous in the locality above mentioned. For the species itself I propose the name *Tiarops indicans*.

2. Another species of the same genus.—Nectocalyx about half the size of that in the species just described, and, together with the manubrium, in general form resembling that of *Thaumantias lucida*. Diadems eight in number, and disposed as usual. The pearly nodules in each diadem vary from 6 to 8. Tentacles 22. Animals non-luminous, and of tolerably frequent occurrence. For this species I propose the name *Tiarops oligoplocama*.

3. Another species of the same genus.—Nectocalyx intermediate in size between those of the two above-described species, while in form it is considerably more concavo-convex, resembling a deeply shaped bowl. Manubrium so small as to be almost invisible, and, together with the nutritive tubes, ovaries, and tentacles, of a rich rose-colour. Tentacles 45 in number, and arranged in two series, in one of which the tentacles are long, and in the other short. Unlike all the known species of this genus, the present one has *four* diadems between each pair of radial tubes—there being thus altogether *sixteen* diadems, or twice the usual number. All the diadems are arranged in a strictly symmetrical manner, and each contains about 30 pearly nodules. The animal is brilliantly luminous when stimulated, the light,

as in the case of *T. indicans*, being confined to a narrow and continuous line round the margin of the nectocalyx. In colour, however, the light emitted by this species is much more blue than that which is emitted by *T. indicans*. This Medusid is somewhat rare, and is certainly the most beautiful with which I am acquainted. For it I propose the name *Tiarops polydiademata*.

4. A species of the genus *Sarsia*, in general form resembling *S. tubulosa*; but having its "umbilicus" and eye-specks of a bright red colour, and its manubrium and tentacles of a rose-pink. It is perhaps doubtful whether these distinctions are sufficient to justify me in assigning to this form a specific character. At any rate, in the absence of information concerning the life-history of this Medusid, it is better, I think, to leave it an open question whether we have here a distinct species, or a mere variety of *S. tubulosa*. Should the possession of red eye-specks, however, eventually prove to be a specific character, I would suggest *Sarsia erythrops* as an appropriate name for the species. The form in question is probably the same as that to which Forbes alludes * as having been met with by Mr. Patterson at Larne.

5. A species of *Bougainvillea* (*Hippocrene*), closely resembling *B. superciliaris*, except in being from three to four times the size which L. Agassiz describes as natural to that species. As mere size, however, is an extremely unsafe criterion of specific difference in the case of the Medusæ, I think it is better provisionally to regard this form as a variety of *B. superciliaris*. *Bougainvillea gigantea* would seem a suitable name for this Medusid, if it should ever certainly prove to be a distinct species.

6. Another species of *Bougainvillea*, also resembling *B. superciliaris* in general, but differing from that species in the following particulars:—(*a*) in being about twice the size; (*b*) in having many more tentacles in each of the four tentacular groups —*i. e.* between 30 and 40 tentacles in each group; and (*c*) in having its manubrium much more richly branched. I am inclined to regard this as a new species, and propose for it the name *Bougainvillea fruticosa*.

To this brief description of new and probably new species I may add a few words upon certain varieties of known species.

(*a*) *Stomobrachium octocostatum*, as described and figured by Forbes, differs somewhat from the varieties I met with in the

* Monograph of British Naked-eyed Medusæ, p. 56.

Cromarty Frith. The size of specimens full of ripe ova was only about two thirds that represented by Forbes; and instead of having the ovaries, manubrium, and tentacles of an orange-colour, the specimens I observed had these organs of a bluish-white tint. Further, the ovaries did not present the denticulated margins which are to be seen in Forbes's drawings. Lastly, the tentacles are arranged in a double series (*i. e.* long and short tentacles alternating with one another), and not in a single series as described by Forbes. The number in the large series, however, agrees with Forbes's description. There can thus be no doubt that this is the variety which Ehrenberg met with (*vide* loc. cit. p. 31 *), more especially as each of the smaller tentacles bears at its base the vesicular body which Ehrenberg describes as occurring in that position. These bodies are remarkable structures, being apparently simple globular cavities without pigments or visible contents of any kind. I do not think, therefore, that they are proper ocelli or eye-specks, as Forbes was very naturally inclined to suppose from Ehrenberg's description of them. Another interesting feature in the histology of this animal is a number of radiating (muscular?) bands, one of which runs to the base of each of the 64 large tentacles. Lastly, the external parts of the ovary are distinctly ciliated, the ciliary action persisting for 20 hours or more after the death of the animal.

(*b*) Professor L. Agassiz describes as of very rare occurrence upon the American coast a peculiar variety of *Sarsia*, presenting six radial tubes, six ocelli, and six tentacles. It therefore becomes the more interesting to state that I met with a precisely similar variety on the east coast of Scotland. Moreover the occurrence of this variety appears to be as rare in the one locality as in the other; for of all the many thousands of *Sarsia* which fell within my observation last summer, I only met with one specimen of the variety in question.

(*c*) In nearly all the species of naked- and covered-eyed Medusæ which I had the opportunity of examining, there was a remarkable absence of monstrous or misshapen forms. In the case of one species, however, such forms were of frequent occurrence. This species was *Aurelia aurita*; and the monstrosities showed them-

* It may also be the variety of which Hugh Miller speaks; but his description is not sufficiently precise to admit of determining which of the two varieties he saw.

selves both as abnormal multiplications and abortions of parts. In all the cases of asymmetrical multiplication which I observed, the peculiarity was confined to the lithocysts, and always showed itself in the same manner. That is to say, I have several times observed, in otherwise normal specimens of *A. aurita*, the presence of nine instead of eight lithocysts; and in all these cases the supernumerary lithocyst, which was always fully formed and provided with the usual hood, was placed beside and in close contact with one of the normal lithocysts. This latter fact appears to me important when considered in relation to the theory of Pangenesis; for upon this theory it would follow that if a supernumerary lithocyst is to be developed at all, we should expect it to be developed in apposition with one of the normal lithocysts rather than in any other position. Our ground for expecting this is, of course, that the theory of Pangenesis supposes similar gemmules to have a mutual affinity for one another; and as lithocyst-gemmules would naturally be plentiful in the region of any normal lithocyst during the process of its development, or of its repair if injured, if any thing went slightly wrong in either of these processes, facilities would be offered for the adhesion of improper gemmules at the point where the disturbing cause acted; and these improper adhesions having once taken place and being then followed by normal adhesions of proper gemmules, the result would probably be a duplex organ.

I have said that in all the cases of asymmetrical multiplication of parts which fell under my notice it was the lithocysts alone that were affected. But besides these cases of asymmetrical multiplication of parts in *Aurelia*, I saw several instances of strictly symmetrical multiplication; and in all these instances every part of the organism was equally, or rather proportionally, affected. That is to say, as in the single instance of multiplication of parts which I observed in *Sarsia*, all the organs of the nectocalyx (eye-specks, tentacles, and nutritive tubes) were similarly affected, so in the several instances of multiplication of parts which I observed in *Aurelia*, all the organs of the umbrella were similarly affected. If any one will turn to the admirable plates contained in Professor L. Agassiz's third contribution to the Academy of Arts and Sciences, and representing a normal specimen of the genus *Aurelia*, he will see that the nutritive canals bear a very definite and symmetrical arrangement with reference to one another, and also with reference to the ovaries

and lithocysts. In particular, there are 16 principal radial tubes that proceed, in straight lines and without branching, from the centre to the circumference of the umbrella. Of the 16 tubes, one passes directly to each of the eight lithocysts, while the remaining eight tubes alternate with these. Thus the 16 radial tubes together mark out, as it were, the whole umbrella into 16 equal segments. Well, in all the examples which fell under my notice of abnormal multiplication of parts in *Aurelia* (other than those of mere duplication of lithocysts), the precise and peculiar symmetry just described was strictly adhered to: in all these examples the undue multiplication extended proportionally to ovaries, nutritive tubes, lithocysts, and tentacles; so that its effect was to increase the *number* while adhering to the *type* of the natural segments above alluded to. It is further remarkable that in all the instances I met with, the degree of abnormal multiplication was the same; for in all the instances the ovaries were 6, the principal or unbranched radial tubes 24, and the lithocysts 12. All the parts, and therefore all the natural segments, were thus in all the observed instances increased by one third of their normal number. It is curious to note that we have here the same proportional increase as that which has already been described in the case of *Sarsia*. This, of course, is probably a mere accident; but whether or not it is so, I think that, as there is certainly no reason either in the case of *Sarsia* or of *Aurelia* to regard the forms in question as distinct species, it becomes worth while to draw attention to the very definite manner in which the abnormal multiplication of parts seems always to occur in these, the only genera of Medusæ in which such multiplication has as yet been observed. It is, perhaps, also worth while to add that in all the cases where I noticed this undue multiplication of parts, both in *Sarsia* and in *Aurelia*, the animals were remarkable for the unusual amount of nervous energy which they displayed. There can be no doubt that this fact is to be attributed to the unusually large supply of nervous matter that was secured to the organism by the multiplication of its marginal bodies.

As regards abortion of parts in *A. aurita*, I cannot say that I have ever observed this to occur in any organs other than the ovaries. In these, however, suppression to a greater or less extent is of pretty frequent occurrence. Most usual is the case where one of the four ovaries is of smaller size than the other three. Often the abnormal diminution extends to two alternate

or adjacent ovaries, and occasionally to three. More rare is the case of total suppression of one ovary. Only on about a dozen occasions have I seen total suppression of two ovaries; and in these it was sometimes the adjacent, but more frequently the opposite, organs that were missing. Lastly, on one occasion I observed, in an otherwise well-grown specimen, a total absence of three out of the four ovigerous pouches. In no case, it may be added, did I observe that a deficiency or absence of ovigerous pouches entailed any corresponding deficiency or absence of any other organs.

I have said that, so far as my experience extends, neither reduction nor complete suppression of parts appears to occur in any organs of *A. aurita* other than the ovaries. It therefore becomes necessary to add that one or more of the lithocysts, together with their hoods, are frequently to be seen of smaller size than the others. As these variations, however, are usually attended with a deficiency of the general tissue of the umbrella in the neighbourhood of the affected lithocyst, I am inclined to believe that in these cases the small lithocyst is one that has been reproduced to repair the loss of the original organ, which I suppose to have been removed by mechanical violence of some kind—a mutilation which seems well indicated both by the deficiency just alluded to of umbrella-tissue in the parts concerned, and also by the cicatrix-like appearance which is presented at the confines of these parts by such tissues as remain.

In conclusion, I may state that towards the end of August all the individuals of this species began to undergo a marked diminution in size. Concurrently with this diminution in size, the intensity of the pink colour (which in this species is characteristic of the ovaries, nutritive system, and tentacles) underwent a marked decrease; so that at last I was only able to obtain specimens one half or one quarter the ordinary size of *Aurelia aurita*, and having nearly all their natural rose-pink colour discharged. I believe that these two phenomena—the loss of colour and the diminution in size—are related to one another in a very intimate manner. Just at the time of year when these two phenomena began to manifest themselves, I observed that all the specimens of *Aurelia* I met with were infested by a species of crustacean (*Hyperia galba*), which lodged chiefly in the ovaries and nutritive canals. These crustaceans appeared to devour with avidity all the coloured parts of their hosts; and I think it was probably due

to the ever increasing numbers of these parasites that the size of the individuals composing the incoming generations of *Aurelia* continued to become more and more diminutive. I shall, however, attend to all these points more closely next year, after which I shall doubtless be able to speak with more certainty regarding them.

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## Notes on the Venous System of Birds.

By Charles H. Wade, F.L.S.

[Read April 6, 1876.]

I propose in the present paper briefly to draw attention to certain structural features in the anatomy of some birds. I cannot claim that my discoveries are original, except in so far as they were made without knowledge of previous work done in the same field by other observers; but, as I hope to show, the points of which I shall particularly treat are so important, and have obtained so little recognition hitherto, that no apology seems necessary for introducing them to the notice of this Society.

My interest in this subject was first excited a few weeks ago, when, in dissecting a specimen of a common Tomtit (the Marsh-Titmouse, *Parus palustris*) I was surprised to find present, as it appeared, only one jugular vein, the right. A second specimen showed a like deviation from the normal type; and, noting this, I made a regular excursion through the well-known text-books, in the hope they might contain some explanation which had before escaped my reading. I may briefly detail the results of my search.

Owen contents himself with saying (Anatomy of Vertebrates, ii. 203), "The vein of the right side exceeds the other in size; it is often twice as large." To what considerable extent the statement needs modifying I will show directly.

Milne-Edwards says (Leçons sur la Physiologie &c., vol. iii. p. 466) "The jugular veins are placed superficially on the sides of the neck; sometimes they are (both) of pretty nearly the same calibre; but in general that of the left side remains very attenuated, while that of the right side presents a considerable volume."

Gegenbaur, who seems closely to have followed Milne-Edwards, says (I quote from the French translation by Carl Vogt, p. 804), "there is atrophy of one of the jugular veins (the left); it is by